# LEARNING ENGLISH IS FUN! INCREASING MOTIVATION THROUGH VIDEO GAMES

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## Abstract

Nowadays, thanks to the spread of a motivating discipline named “gamification” [1], video games are getting into our educational methods. The idea of using games to improve the learning process in varied aspects of life is not new [2]. Nevertheless, it has only been recently, with the proliferation of the Internet and of multiple sorts of digital devices, that teachers have started using video games for their class. Moreover, there are games (or more particularly, video games) which were developed with the original purpose of teaching or other serious aims in a more general context. These last have been called “serious games”. Games, and more specifically video games, have therefore turned into something more important than just entertainment and eventually, they have become a matter of interest from the point of view of research [3, 4].

Although there are a lot of reasons that substantiate the use of “serious games” as a new educational resource [3], the increase in student motivation levels, and thus in their involvement in their own learning process, would justify in itself their introduction in any area of our education, and particularly in the learning of a foreign language. Most educational, social and research agents are convinced of this fact; however, they are also claiming rigorous research that allows to demonstrate it scientifically [4].

In this paper we present a study made with 16 university students with different levels of proficiency in English, who were divided into two groups: those with a basic level (B1 or lower) and those who had an intermediate to advanced one (B2 or higher). These two groups had the opportunity to get to know and interact with a serious video game developed at the “Universidad Politécnica de Madrid” with the aim of helping in the teaching-learning process of English as a foreign language. Before and after the interaction, all students were interviewed on various aspects related to their English learning process. Although the results show some differences in the two groups, they mainly agree in that the use of the video game greatly increases their motivation to learn English, even though they also consider that they would be able to reach the same level of English by studying in a more traditional way. In addition, when the students were straightly asked about the usefulness of the video game to learn English, their answers in a graded scale of agreement, ranging from 1 to 5, had a mean value of 3.75.

Keywords: gamification, serious games, education, language learning, English, assessment.

## 1 INTRODUCTION

Although we can find references at the beginning of the 20th Century regarding the use of games to improve the learning process in varied aspects of life [2], it has been only recently, with the proliferation of the Internet and of varied digital devices, when this idea has begun to gain popularity in the educational area, turning even into an important research topic [3]: are video games really effective to improve education?

Several authors agree that video games can improve the quality of education ([5-8]), in fact, the most recent generations of children who were born in last 20 or 30 years have grown up in a totally computerized environment, where the Internet, electronic devices, video games and all kinds of IT tools have become an integral part of their lives. Moreover, this new generation particularly different from previous ones as regards their capacities in the use of technologies has been clearly identified and called "Net Generation" [5]. Thus, it seems quite evident that a whole series of youngsters who

have become used to spend great part of their time surfing the Internet, using electronic devices, and playing video games, would see their motivation significantly enhanced if they were given the option to use digital resources in their learning when approaching any subject [9, 10].

The increase in motivation levels, and therefore of the students' intensity of involvement in the learning process, is a good reason that justifies *per se* the introduction of video games as an ordinary educational tool. Nevertheless, there are in fact many other reasons that substantiate the use of games that have been highlighted in previous research such as: easy accessibility; easy content update; high customization level; low cost for students; the possibility their offer to develop eye-catching graphs that attract the students' engagement in the task and/or high level acceptance on the part of students, who will see the educational tool as a means of entertainment [3] (the ideal objective would be to reach an unconscious learning on the part of the students, that is to say, to let them acquire the educational content and capacities programmed while playing for fun and with minimum effort or even noticing [4]).

The use of games (or more specifically, of video games) with a different "more serious" aim than just amusement is part of a discipline that has been called "gamification". In addition, if the game was conceived already from its design stage to fulfill the above mentioned objective, then it is called "serious game". It should be highlighted at this point that there are many definitions of "gamification" [1, 11-14].

Some authors try even to differentiate this discipline from "serious games". For example, S. Deterding, together with other authors, in his very well-known article [11] defines the discipline as "the use of game design elements in non-game contexts" and, based on this definition, he establishes a border between "gamification" and "serious games". He argues that the philosophy of "gamification" is basically and simply to use some typical elements of game in real-life, whereas a "serious game" is a full-fledged game that is generally developed in an environment created with a specific serious aim, but even the same authors admit in their work that this discrimination is rather fuzzy and subjective. In our case we prefer the definition given by K.M. Kapp in his book [1]: "Gamification is careful and considered application of game thinking to solving problems and encouraging learning using all the elements of game that are appropriate". From this point of view "gamification" and "serious games" share aims and moreover, the author considers these last as part of "gamification" as specific discipline and gives a clear example: a teacher in a class with many students introduces an electronic voting system by means of which every student can answer to the questions that the teacher is asking just selecting among several options, each of these corresponding to a button of the system. By using this system the teacher asks several questions that will be considered for the evaluation of the students. In this context the dilemma is whether the method used by the teacher is a game with serious consequences (to fail or to pass an exam) or rather the "gamification" of a quite serious process as is the student assessment. Fairly evidently, the aim of the teacher is to achieve an extra motivation on the part of the students so that they participate further in the process of evaluation of the subject, making it much more pleasant and from this point of view it is not worth discussing whether we are talking about a "serious game" or a "gamification" process since both approaches share the same aims.

Different authors [1, 8] enumerate typical elements of games that can be used in a "gamification" process and relate them with the diverse psychological theories [8, 15] that influence motivation enhancement. Some of the most significant examples are the following:

- The **points** that the players obtain as the video game develops, increase their motivation according to the behaviorist learning perspective and from the psychological perspective of interest. The accumulation of points triggers motivating mechanisms as positive reinforcement that is achieved by immediate recognition and obtaining rewards.
- The selection of **avatars** and the possibility of **character configuration** are typical features that influence motivation positively according to psychological theories of interest and self-determination. Actions like these generate motivating mechanisms as the feeling of autonomy and personal implication in achieving the objective.
- **Tables with the highest scores** rouse several motivating mechanisms described by psychological trait and self-determination perspectives as: competitiveness, feeling of power, feelings of individual capacity or group progress, improvement in social relations and in collaboration skills when the scores are shared in groups, etc. Nevertheless, this feature of "gamification" can also turn out to be critical from the moment when only a few players occupy

the first positions. As a consequence of the ranking, the rest of the players who are not high up on the list and especially those situated at the end can lose motivation.

- Other features as described by [8] and [1] are: **rewards** that can be collected during the game and that imply a visual representation of the achievements; **progress bars** that describe the current position of the user in relation to the final objective; **evolution graphs** that compare different accomplishments made by the users so that they are aware of their own progress; **small challenges** that the user can fulfill during the game; and to provide the video game with a meaningful story. Many of these characteristics, as can be observed, are related with the motivating value of offering feedback to the user [16].

The idea that motivation can improve significantly the process of teaching-learning of any discipline also convinces most researchers, nevertheless formal works that allow to demonstrate this fact scientifically are becoming increasingly necessary and are expected [3, 8, 17]. For example, in [3] an analysis is done of 11 recent research works that approach comprehensive studies on the actual effectiveness regarding the use of video games in educational settings, and although even the authors themselves state that final conclusions cannot be extracted from a study of only 11 research works, they reach preliminary conclusions that video games are not effective to fulfill educational aims, thus supporting the skepticism concerning the use of “serious games”. But, provided that the increase in students motivation seems to be proven and there are numerous studies that relate motivation with greater implication in the educational process and consequently with a better learning [18-20], the authors recommend to continue developing research that allow to prove the efficiency of video games, or at least of “serious games”, in education.

The present work aims therefore to contribute with more knowledge from research to shed some more light on this matter. The article is structured as follows: in section 2 we will analyze the state of the art as regards those “serious games” orientated to facilitating the learning of English as a foreign language; in section 3 we will present the video game that is being developed at the “Universidad Politécnica de Madrid” (Technical University of Madrid), highlighting its most outstanding "gamification" features; we will continue in section 4 by describing the evaluation process that has been designed to test the tool; the results will be presented in section 5 and we will end up by exposing the main conclusions that result from this study.

## 2 SERIOUS VIDEO GAMES IN THE CLASSROOM OF ENGLISH AS A FOREIGN LANGUAGE

If we focus on the learning of a foreign language, the use of video games or “serious games” seems to be even more valid than in any other context. A recent study [21] in the year 2011 concludes that teachers of foreign languages believe in the learning potential of video games in their language subjects and consider this potential to be higher here than in the rest of the subjects in the curriculum. In fact, the use of games in education has been for long a usual practice in the foreign language classroom [22, 23]. Nevertheless, deeply immersed in the digital age as we are today, the use of video games as a common tool in foreign language learning seems to be still an unresolved matter when it comes to methodology. With regard to this fact, there are only few research studies that approach the analysis of video game or “serious game” efficiency in the context of foreign language learning [24-28].

Addressing more particularly video games oriented to strengthening the process of English as a foreign language learning, these are, in most cases, limited to sets of mini-games that can be motivating for young children [24, 29, 30] but might turn less attractive for teenagers. We have only found two games that pursue more gripping objectives where the students must overcome different challenges distributed through a whole series of scenes with graphical adventure format: [31] developed for PC and [32] developed for PlayStation. However no research work analyzing their efficiency or the motivation level that the user reaches with these video games has been found.

As for practice in speaking skills we have only found a few video games that implement this capacity [27, 33-35] due to the technical difficulties involved in developing these activities. Among them, [33] is not actually a video game but a basic application that instructs the user by means of pictures in the way one must articulate the different sounds to achieve a good pronunciation. The works [34, 35] describe simple video games to learn Arabic, from among these, [34] is just a conversation simulator, and show poor graphs, where the users have to give instructions orally choosing from among a limited number of possibilities read on screen in order to reach further stages in the game. Both studies attempt to evaluate the game, concluding that it is in fact motivating for the users (20 in the

first case and 22 in the second). Regarding its efficiency, [34] reports an improvement in the ability of the 20% with a sample of 9 subjects, whereas results in [35] are not so clear.

With regard to [27], it is also a video game designed for the armed forces in USA mainly focused on the learning of Arabic, but here, an advanced video game incorporating speech recognition is presented. The aim of the recognition software is to gain information as whether the user is able to achieve the objective, rather than to recognize exactly what the user has said. The evaluation of the software efficiency is not detailed in depth. The authors indicate that after the use of the video game the knowledge acquired by the soldiers was measured, but it does not report about pre-tests, and therefore it is not possible to know if the participants had any previous knowledge of the language and/or what their prior level was. In any case the evaluation was carried out with more than 300 soldiers in three different environments and in all cases the authors conclude that the users improved substantially their command of Arabic language. It is also stated that the students reported a high degree of motivation with the use of the program.

To conclude about training in speaking skills in English language, it seems that some simple games as could be MingoVille [24, 29] include some type of speech recognition, but no research paper has been found that presents or evaluates its outcomes.

## 3 DESCRIPTION OF OUR VIDEO GAME

Within a Project of educational innovation at the “Universidad Politécnica de Madrid” a “serious game” has started to be developed orientated to facilitating the learning of English as a foreign language. The game has been conceived to help students acquire a B1 level according to the Common European Framework of Reference for Languages (a level that in Spain should have been achieved on having finished high school). Nevertheless, the design consists of a graphical adventure attractive enough to motivate teenagers as well as other more adult students who eventually want to improve their level of English, and therefore, the game is designed to be easily adapted to higher language competence levels in the next future.

In our story, the main character is a child who, due to a magic malignant force has turned into a strange being transported to an unknown world (figure 1). The mission will consist of directing our friend to find varied ingredients, which will help him to make a potion that will let him return to the real world, back in the shape of a child.

Fig 1. Graphic adventure main character

During the game the student will face different challenges, some of them related directly with the learning of English and others more typical of a graphical adventure or even an Arcade game where the characters can even shoot. In any case the player will always be able to move freely in the scene and to pass from one challenge to the following one without the need to succeed in it, so that motivation is never affected as the player will never get stuck in any part of the scene. Evidently, there are a number of control points (the end of the different levels) that the users will not be able to surpass if they have not covered the mandatory learning aims predicted and designed for the above mentioned level, in accordance with the educational curriculum program. The English language tasks are hidden in different parts along the scene so that the students are the least possible aware that they are completing a traditional language activity.

During the course of the game, the player will find different tasks to improve the four language skills: "reading", "writing", "listening" and "speaking". The design of the above mentioned activities is absolutely adapted to the educational curriculum so that the student will develop through their resolution all the capacities established in it.

Obviously the game has been designed as a “serious game”, therefore relying on varied gamification tools that will help the users maintain their motivation. The following are some of its most characteristic features:

**Small challenges**: challenges that the player will be passing and that will help him/her to reach the final objective. Some of these challenges will be related to the learning of English, whereas others are effortless problems typical of any video game.

**Points**: whenever the students solve a challenge they receive a few coins that they will have to use, partly, to access other challenges. In any case the system controls that the user does not remain blocked when lacking coins and, if this was the case, the player would be given a few coins found in a bag by chance.

**Table with the highest scores**: it will depend on the number of coins the student has when he/she finishes every stage of the game.

**Rewards**: ingredients for the potion that the player will be collecting whenever he/she overcomes a challenge. Some ingredients can be obtained by overcoming challenges not related to the English language, so that the student does not associate both concepts (English=reward)

**Progress bar**: in the shape of maps that will indicate the user which his/her location is.

**Selection of avatar**: it has been decided to incorporate the option to select a male or female main character in a future game improvement.

**Feedback**: the student receives feedback by means of points, rewards, progress, etc. In addition, there is a “fairy” that will help our main character not to remain blocked in any of the stages, provided that the player requests her help, and although, evidently, the player will be penalized when using this “extra” help.

**Attractive graphs**: as the ones presented in figures 1 and 2, which plunge the player inside the game and engage him/her to continue practicing.

**Meaningful story**: there is a clear final aim – help our main character to return to his real world - and in order to do so, he will have to overcome smaller challenges with which the students will improve their English while thinking and feeling that they are just playing (game thinking [1])


Fig 2. A scene in the videogame

# 4 DESCRIPTION OF THE VALIDATION METHOD

With the aim to test the usefulness of the “serious video game” designed, it was presented to second year students of a degree in Engineering and Telecommunication Systems at the “Universidad Politécnica de Madrid”. A group of 16 students with different competence levels in English had the opportunity to use and interact with an advanced prototype of the application for an hour approximately.

In this same session, two surveys were carried out based on the model presented by Kebritchi *et al* in [10], which in turn is based on the Keller's ARCS Model [36]. This model measures the motivation along four major attributes of Attention, Relevance, Confidence, and Satisfaction (ARCS). Attention refers to whether students' interest is gained and maintained during educational activities. Relevance is related to whether a student perceives the activity as a personal need. Confidence affects the students’ expectations to succeed at the activity. Satisfaction refers to the rewards that the student anticipates from the activity.

The first survey consisted of 7 questions related to the motivation that the student has to learn English and these were answered twice: once before having used the video game and the second one after having practiced for a while with the program. The second survey consisted of 4 questions to measure the affinity of the students with normal video games and their impression about the educational capacity of the serious game presented in the session. This second survey was only completed after the interaction with the game.

The response to all the questions was numerical graded from 1 (very low agreement) to 5 (very high agreement).

The questions that conformed the first survey were:

1. The learning of English is motivating and produces satisfaction on me.
2. Learning English is important for my future.
3. Learning English is easy.
4. Learning English is entertaining.
5. The variety of materials and activities is a factor that motivates me to learn English.
6. The methodology used to learn English influences the level of competence acquired.
7. The introduction of technological resources in the learning of English can turn the process into irritating or frustrating.

As for the second survey, this consisted of the following questions:

1. Do you like to play video games?
2. Comparing this video game with others more focused on entertainment, does it seem attractive?
3. Do you think that the use of this video game could help you to learn English?
4. Do you think that the use of this video game increases your motivation to learn English?

# 5 RESULTS

In Figure 3 the histograms are presented corresponding to the 7 questions in the test of motivation and that show the opinion of the 16 students interviewed before and after using the video game. The results of the test before the interaction with the program are in blue and the ones corresponding to the test completed after using the video game are in red. Table 1 shows the average values obtained for every question in both tests.

It can be observed that in all the questions, except in number 2 and number 7, the average of the answers increases after the student has actually interacted with the video game. Question number 2 is a particular case and can be considered to be a control question since it refers to the importance that the students give to English for their future (as could be for example in their professional career) and therefore it seems quite logical that their answer does not vary before and after having practiced with the video game. Question number 7 (on whether introducing technological resources in the learning and can be frustrating or irritating) slightly lowers the evaluation after the presentation of the game. In

this case, the question is asked inversely from the rest of questions, in other words, here, a low value in the answer indicates that the game is not a disturbing factor in the learning of the language.

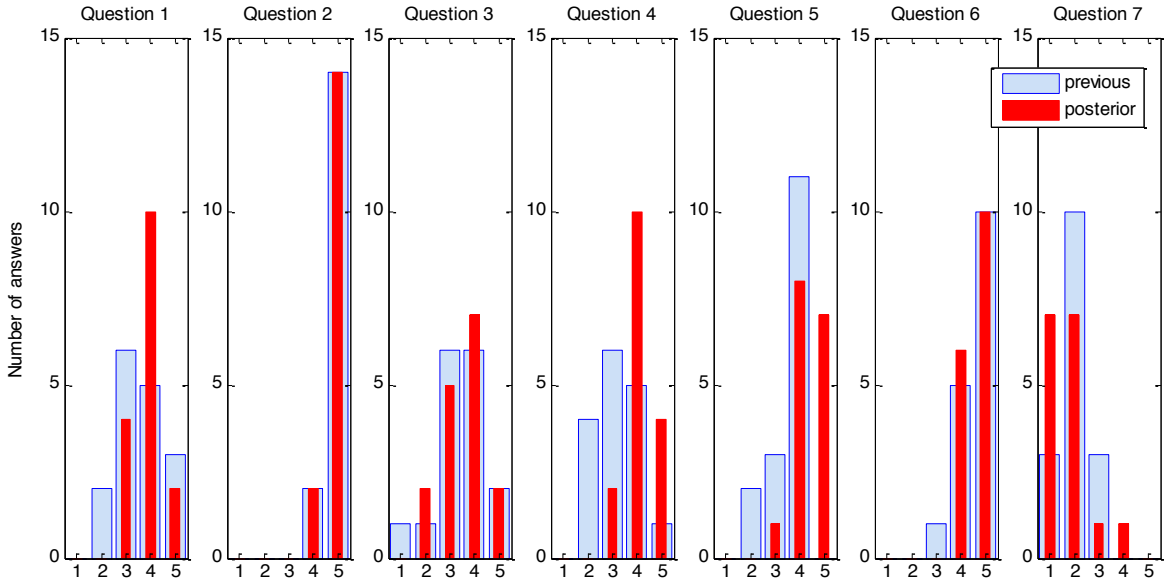


Fig 3.Students' opinion histogram before (blue color) and after (red color) using the videogame.

Tab 1. Average value of the students for each question in the motivation survey before and after the use of the serious game.

| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 |
|---|---|---|---|---|---|---|---|
| Pre test-mean | 3.56 | 4.88 | 3.44 | 3.19 | 3.56 | 4.56 | 2.00 |
| Post test-mean | 3.87 | 4.88 | 3.56 | 4.12 | 4.37 | 4.62 | 1.75 |

On the other hand, the answers to questions number 4 (learning English is entertaining) and 5 (the variety of materials and activities is a factor that motivates me to learn English), directly related to the motivation of the students towards the process of teaching-learning, offer a substantial increase after having practiced with the program. In addition, differences between PRE and POST answers for both questions are statistically significant, as the p-value obtained after applying a non-parametric t-test for differences in the means [37] was approximately 0.002.

In short, it can be verified that although students think that the learning of English is not substantially easier or more difficult (question 3) or that English is neither more motivating (question 1) depending on the use or not of the video game, there is a considerable increase in the motivation of the students towards the learning process after playing with it, although they also think that the competence level that they will acquire is the same (question 6). It might be determined therefore, that the tool mainly influences the level of the students' involvement in their own learning process.

If we consider different groups of students according to their departing level of competence in English declared by the students themselves at the beginning of the session (B1 or lower and B2 or higher), two quite balanced groups result with 9 students in the first one and 7 in the second. As regards the study of the two groups separately, the same conclusions are basically obtained for both as those already reported for the whole group. Nevertheless, some differences can be observed:

The students with a B2 level or higher consider the learning of English easier and more motivating than the students in the B1 or lower group do, which is considered to be logical enough in any subject where the student departs from a wider knowledge in the matter. Also, the group B2 thinks that the learning of English is entertaining already in the pre-test (3.71 opposite to 2.78 in group B1) and therefore their evaluation does not change significantly after using the game (0.29 points more opposite to 1.44 in group B1). Nevertheless, students continue evaluating very positively question number 5 related to the motivation value of the materials used to learn English, with an increase of 1

point in the average of the post-test opposite to a raise of 0.66 points in group B1. Table 2 summarizes these data:

Table 2. Students' average value for each question in the motivation survey divided in two level groups: B1 (B1 or lower) and B2 (B2 or higher).

| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 |
|---|---|---|---|---|---|---|---|
| Pre-mean B1 | 3.11 | 4.89 | 2.78 | 2.78 | 3.56 | 4.56 | 1.78 |
| Post-mean B1 | 3.78 | 4.89 | 3.11 | 4.22 | 4.22 | 4.56 | 1.33 |
| Pre-mean B2 | 4.14 | 4.86 | 4.29 | 3.71 | 3.57 | 4.57 | 2.29 |
| Post-mean B2 | 4.00 | 4.86 | 4.14 | 4.00 | 4.57 | 4.71 | 2.29 |

The results of the second survey can be observed on Table 3. It can be seen that generally speaking, the students consider the serious game motivating and useful to learn English and furthermore, attractive when compared with other video games only oriented to leisure (which was one of the main objectives concerning its design). Observing the results per group, the major difference appears in the answer to question 3. Although both groups think that the game is useful to learn English, the students with a lower competence level who still need more time and greater effort to learn give a more positive evaluation.

Finally, and as an interesting piece of information, just to point to the fact that those students who gave question 1 (Do you like to play video games?) a low value (2 points), also answered to question 3 concerning its usefulness with values of 3 and 4 points

Table 3. Students´ average answers to the 4-question second survey. General results and results per group.

| | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|
| General | 3.44 | 3.44 | 3.75 | 3.75 |
| Group B1 | 3.67 | 3.44 | 4.11 | 3.78 |
| Group B2 | 3.14 | 3.44 | 3.29 | 3.71 |

## 6 CONCLUSIONS

In a world increasingly dependant and led by electronic devices as PCs, tablets, smartphones, etc., the introduction of these sort of devices in our educational methodology is felt as a natural consequence of their fast development. English as a foreign language seems to be a subject especially adequate to incorporate the use of these new technologies. In this respect, the incorporation in the teaching-learning process of "serious games" or, more specifically, "serious video games" contributes positively to raise the students´ motivation and therefore to favor their further involvement in their own learning.

At the "Universidad Politécnica de Madrid" (Technical University of Madrid) a video game is being developed at the moment to contribute to fill this gap in our educational system. It is a graphical adventure with a carefully thought story and an outstanding appearance, so that it is attractive for the users: students preparing to obtain the B1 level of English. The main aim in the design of the application was to obtain a game with which the students could develop all the four language basic skills: "reading", "writing", "listening" and "speaking", but always incorporating game thinking as one of the most important features of "gamification". The idea is that the students manage to develop their own English learning aims while thinking and feeling that they are playing.

From the evaluation of the application carried out by 16 second-year students of a degree in Engineering and Telecommunication Systems with different levels of English, it can be concluded that the video game offers the students a considerable increase in their motivation towards the learning process, without affecting, in their own opinion, the potential improvement in the different skills they may have. In this regard, the degree of the video game usefulness was established by the students in

a level of 3.75 in a graded scale of agreement, ranging from 1 to 5; and in the case of students with lower competence in English, this value increases up to 4.11 points.

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